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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 97 of the	)	**RM-8737**
Commission's Rules Governing	)	
the Amateur Radio Service to	)	
Facilitate Spread Spectrum	)	
Communications	)	

REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

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March 12, 1996

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SUMMARY

The American Radio Relay League, Incorporated (the League), the national association of amateur radio operators in the United States, submits its reply to comments filed in response to the above-captioned Petition for Rule Making (the Petition) filed by the League December 12, 1995.

The problem that the League's petition seeks to address is not too much spread spectrum in the Amateur Service. The problem is not enough spread spectrum experimentation. Many of the commenters are seized with protecting their existing narrow-band operations, and are concerned (unnecessarily) about increased noise levels in bands used by narrowband modes, rather than promoting spread spectrum for the benefits, including spectrum efficiency, that it can provide. While the Amateur Service is intended to be an experimental service, which requires flexible rules and some trust of the licensees carrying out experiments, some voices speak in favor of even greater restriction and mandatory control. The imposition of additional constraints would guarantee that the Amateur Service will not be able to keep up with spread spectrum developments in Parts 15 and 90 of the Commission's rules, and will be prevented from maximization of spectrum efficiency in its own bands.

The League suggests that its petition, which after all suggests only a modest deregulatory effort, is properly aimed at increasing the flexibility of spread spectrum users in order to allow the development of compatible systems which maximize spectrum efficiency. Those who oppose this increased flexibility do not share the League's view of the Amateur Service as a fundamentally self-regulated service that makes its own efficient accommodations for the varied uses of its frequency allocations. Without mandatory frequency coordination, non-standard definitions of interference, or detailed Commission regulation of spreading codes, the League believes that additional spread-spectrum experimentation is in the best interests of the Amateur Service, and that compatible sharing, long a benchmark of amateur radio, will be as successful in the future as it has been in the past.

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To: The Commission

REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay League, Incorporated (the League), the national association of amateur radio operators in the United States, by counsel and pursuant to Section 1.405(b) of the Commission's Rules (47 C.F.R. §1.405(b)) hereby respectfully submits its reply to comments filed in response to the above-captioned Petition for Rule Making (the Petition) filed by the League December 12, 1995. Public notice of the Petition was given by the Commission January 26, 1996 (Report No. 2118, document 61283, released January 26, 1996). For its reply comments, the League states as follows:

I. Introduction

1. The comments in response to the League's petition were mixed. Several, filed by those with experience, either vocational or through amateur radio spread spectrum experimentation, expressed support for the deregulatory proposal of the League regarding spread spectrum communications. The comments of certain repeater coordination groups are generally opposed

to the petition. This division of comments is not unexpected, and intra-service disagreement concerning interference potential is understandable. However, in the League's opinion, the proposals contained in the League's petition offer neither a significant increase in interference potential to narrowband uses, nor any compatibility issue that cannot be resolved through cooperation between and among amateurs themselves.

2. The problem that the League's petition was intended to address is not that there is *too much* spread spectrum experimentation in the Amateur Service, or that spread spectrum communications are causing or are likely to cause interference to narrowband amateur modes; rather, the problem is that there is, at present, *too little* spread spectrum experimentation. The reason for that, as set forth in the League's petition, and in the comments of the Tucson Amateur Packet Radio Corporation (TAPR), is that the rules governing spreading codes are overly restrictive. As TAPR states:

> TAPR generally supports the recommendations made by the ARRL in its Petition. Spread Spectrum (SS) technology has not made great advances in the amateur radio service since it was first permitted in 1985, in part due to the fact that, by today's standards, the Part 97 regulations on amateur spread spectrum are extremely restrictive. In particular, the small number of fixed spreading codes permitted under Section 97.311(d)(1) inhibits the use and development of SS by amateur radio stations. TAPR believes that it is in the public interest, and in the interest of the amateur radio service, to change the rules for SS in order to accelerate the adoption of SS by the general amateur community.

TAPR Comments, at 2.

3. It would appear from a review of the comments in opposition that the opponents of the petition largely misunderstand the relief requested, and, as well, what is permitted for SS communications under current Section 97.311 of the Rules. It has also been largely ignored that the principal current SS experimentation over the past few years has been conducted pursuant to extended Special Temporary Authorization granted by the Commission. That in and of itself

is significant, as it evidences the overly restrictive nature of the current SS rules and the actual effect on SS experimentation and utilization in the Amateur Service.

II. Comments in Support of the Petition

4. As noted above, TAPR generally supports the League's petition. While TAPR agrees with the desirability of automatic power control, it believes such a requirement should be phased in over time in view of possible compliance difficulties. The League believes that the pendency of this rule making proceeding may be sufficient time for designers to comply with automatic power control limitations, but would not be opposed to the specification by the Commission of a future date certain when all SS communications would be required to implement automatic power control. The League cannot at this time agree with TAPR's proposed amendment that would permit SS on all amateur bands above 50 MHz, or the elimination of the CW identification requirement, as both provide protection for existing users and a means of self-enforcement.

5. Robert A. Buaas, K6KGS, wholly supports the League's petition. He is the holder of the current Special Temporary Authority (STA) permitting any spreading sequence on all amateur bands above 50 MHz, and has perhaps more experience with amateur SS communications than anyone else. His experience with spread spectrum experimentation qualifies him as one of the relative few who have operated spread spectrum under a test program using various spreading codes. In his penultimate paragraph, Mr. Buaas suggests that spread spectrum be permitted at all bands above 50 MHz, which, again, the League cannot support at this time. The amateur bands at 50, 144 and 222 MHz are among the most popular bands for numerous narrowband communications, and the higher bands are presently best suited for additional SS experimentation using varied spreading codes, due to larger bandwidths available.

6. The Comments of the Manager of the National Communications System (NCS) are fully supportive of the League's petition, noting that:

> The proposed changes would (1) permit brief test transmissions using spread-spectrum emissions; (2) permit international spread-spectrum communications between United States' amateurs and amateurs in other countries that permit use of those emissions; (3) delete unnecessary restrictions on spreading codes and repetitive definitions of "harmful interference"; and (4) provide for automatic power control to insure use of minimum necessary power to conduct spread-spectrum communications.

Comments of NCS, at 2. As listed, it is apparent that the relief requested in the League's petition is not extensive; nor can SS operation pursuant to the changes generate any significant amount of interference to other amateur transmission modes; quite the contrary: the automatic power limitation proposal is intended to, and should, significantly decrease interference potential. No commenter suggests that there has been any interference from SS transmissions thus far, and no significant interaction is anticipated. In fact, the relief of restrictions on spreading codes will permit experimentation with a wide variety of spreading codes to determine which are *least* likely to cause interaction with narrowband amateur modes.

7. The comments filed by John Mock, KD6PAG, are generally supportive of the League's petition. In particular, he agrees that the present amateur SS rules are overly restrictive. However, he then suggests certain cautions in any deregulatory effort. His comments suggest that the Commission give serious consideration to issuance of Special Temporary Authority (STA) for spread spectrum experimentation, rather than a permanent rule change. In this respect, perhaps Mr. Mock does not understand that in an essentially experimental radio service, albeit one which has extensive public service and public safety characteristics, STAs should have very limited application. The rules governing shared, multimode frequency use should be as flexible as possible, relying in large part on the voluntary sharing criteria and

cooperation that has been a cornerstone of the Amateur Service for many years. Furthermore, amateur SS operation has, as discussed above, been premised on STA authority for quite a few years now. The present STA, issued to Mr. Buaas, allows essentially any spreading sequence on all frequencies above 50 MHz. The League's petition seeks to make permanent rule changes to facilitate experimentation with spreading sequences on frequencies *where spread spectrum emission is already authorized.* There is nothing in the proposed rule changes that would permit or cause, to any greater extent than do the current rules, interference to narrowband modes. Mr. Mock also raises band planning concerns. The League firmly believes that matters best left to voluntary band planning should not be written into the Rules. This is especially true with respect to bands where spread spectrum is already permitted. Mr. Mock, as others, are properly mindful of the effect of spread spectrum signals on other users, particularly weak signal narrowband users, who conduct propagation research and experimentation which requires low noise thresholds. The League also absolutely intends to continue to protect weak-signal users. The thrust of the League's petition would be to do so by the introduction of automatic power control above 1 watt, and spreading codes that would improve compatibility with other users.

III. Comments In Opposition To The Petition

8. The Indiana Repeater Council (IRC) opposes the League's petition, but its comments are confusing. They indicate a lack of understanding of the proper role of regulations on the one hand and interference avoidance techniques developed and implemented by amateurs. IRC also apparently confuses existing §97.311 spread spectrum rules and the changes proposed in the League's petition. The technique it offers for interstitial frequency hopping is certainly interesting, but it is but one example of the need to permit flexibility in spreading codes. The suggestion bears out the need to allow experimentation with SS in a more flexible regulatory

environment, if for no other reason than to permit codes that minimize interference to narrowband modes. There is no relevance of the specific spreading code that is discussed in the IRC comments to the instant petition for a change in the regulations unless the point is to consider that particular code as a candidate for the Rules. The IRC suggestion of a specific spreading code, however, runs counter to the League's entire point, which is to eliminate exclusive specification of permitted spreading sequences in the Rules. The present spreading sequences are not optimal for spread spectrum signals sharing with other signals in the band, be they narrow-band or spread. Eliminating specific sequences would allow amateurs to experiment with spreading strategies to increase compatibility, and to permit amateurs to adapt new spreading codes to new applications.

9. The subbands proposed by IRC for spread spectrum again speak to implementation issues, which should be left to cooperative development within the Amateur community, rather than incorporated into the Rules. Finally, the Indiana Repeater Council argues against using spread spectrum below 450 MHz. The League's petition did not propose any change in frequency bands where spread spectrum is permitted by existing Rules. SS emissions are presently permitted in the 70 cm band. There is no reason whatsoever to suggest that any further restriction on the use of a particular emission mode already permitted in a band is justifiable.

10. Henry B. Ruh, KB9FO, has aligned his comments with those of the Indiana Repeater Council, including endorsement of the interstitial sharing arrangement. Additionally, however, he introduces the idea of allowing spread spectrum operation in the band 219-220 MHz. This concept is interesting in its own right, and perhaps deserves further discussion, but it goes beyond the scope of the League's petition and need not be considered. It raises inter-service sharing issues that are best reviewed after additional experience is gained in amateur occupancy

of that band.

11. Comments of the Wisconsin Association of Repeaters should be dismissed as not relevant to the instant petition. Those comments suggest the restriction of spread spectrum operation to bands above 902 MHz, without any technical justification therefor. The suggestion is that there will be an increase in the noise floor that will cause some unspecified interference to ongoing amateur operation in the band. Interestingly, this opinion is not shared by the government radiolocation service users which share the 420-450 MHz band with the Amateur Service. In any event, nothing is stated in the comments concerning the rule changes proposed by the League, and the comments of the Wisconsin Association of Repeaters appear misdirected.

12. The Mid-America Coordination Council, Inc. (MACC) filed two different comments, by two different authors. Each takes issue with the League's identity as the national association of amateur radio operators in the United States. In fact, the League has fulfilled this role for the past eighty years, and it is so recognized by the Commission, as well as other government agencies and internationally. The assertion of MACC's various spokespersons that the League did not solicit input prior to filing its petition is both unsupported and factually inaccurate. The League's Board proceedings have publicly discussed this issue for almost two years. The League went the extra mile prior to filing this petition by holding a public forum in Long Beach, CA September 2, 1995, at which the signer of one of the two MACC comments actively participated. He even cited the public meeting in those comments. MACC's comments go to great lengths to distort the League's position on harmful interference, which has a standard, internationally understood meaning. Harmful interference between amateur modes is not acceptable. It is, however, clearly distinguishable from incidental "popping" of the squelch in a receiver. Harmful interference is adequately addressed by the current amateur Rules, and it

need not be restated in the rule governing SS emissions. MACC's contention that the League is serving some "special interest" is patently wrong. The League recognizes that, like its use in other services, spread spectrum in the amateur service is a media access technique that, properly implemented, can permit greater spectrum occupancy with less interference than is currently possible using *only* narrow-band frequency division multiple access (FDMA) techniques. It is reasonable and proper to be concerned with coexistence between spread spectrum and FDMA, and as well with the orderly phasing in of spread spectrum. These matters, however, are best left to the Amateur Service itself. The Commission need not be asked to be the arbiter of emission mode compatibility. Nor should the Commission add new restrictions or attempt to micromanage the increased usage of spread spectrum, absent significant evidence of a failure of the Amateur Service to self-regulate in this respect. MACC takes issue with the public statements of the STA holder and claims the STA tests were "seriously flawed". These comments are without foundation and were apparently made without reference to the test results. Specifically, MACC proposes to confine spread spectrum to the band 902-928 MHz. As discussed above, the League's petition is silent on frequency issues. In summary, none of MACC's points address the instant petition and should be discarded.

13. Comments of the Southern California Repeater and Remote Base Association (SCRRBA) introduce many extraneous issues that have nothing to do with the League's petition, which seeks principally to permit additional spreading codes, rather than the one specified in present Rules, and to introduce automatic power control. SCRRBA's discussion elaborates on how spread spectrum could interfere with narrow-band users without crediting the designers of the spread spectrum systems with the ability to select parameters that maximize compatibility. They have introduced comparisons of spread spectrum and narrow-band power densities that

show spread spectrum in the worst possible light without documenting either the benefits in frequency re-use permitted by SS emissions, or the spectrum inefficiency of FDMA systems. Many of SCRRBA's detailed comments address FCC Rules that have been in place for ten years, rather than the narrow relief requested in the League's petition. In its comments at page 9, SCRRBA seeks to delete the word "harmful" before "interference" "unless the SS station is utilizing a frequency and bandwidth recommended by a local frequency coordinator, in which case the two station licensees are equally and fully responsible for resolving the interference." This would have the effect of making any alleged interference attributable to spread spectrum emissions a Rule violation. This would apply even to unintentional triggering of carrier operated receiver squelch. It would also require local frequency coordination, now mandatory, prior to any spread spectrum experimentation, which would be an unacceptable and unprecedented imposition on spread spectrum users. Any mandatory coordination requirement raises a host of unrelated and broader issues which have no application whatsoever to the relief requested in the League's petition. While stating that automatic power control is "a reasonable concept," SCRRBA introduces extraneous issues. One is the proposal to identify SS emissions at maximum power to facilitate identification. This is indeed absurd, and completely contrary to the spirit of the present Section 97.313(a), which requires the *minimum power* necessary to conduct the communications. SCRRBA's proposal could (and would inevitably) have the unfortunate effect of *causing* interference by means of the identification that would not be present with the spread spectrum signal alone, owing to the fact that the identification would be narrow-band, while the spread spectrum signal would have its power distributed to lower the power density. The current rules are silent on exactly how SS station identification is to be accomplished, but it does not suggest putting all the transmitter power into the narrow-band ID. Again, SCRRBA seeks to

impose local frequency coordinator's approval of the method of ID, something that is not required, nor justified, for any other type of emission in the Amateur Service. In summary, SCRRBA has sought to introduce numerous issues not germane to the League's petition.

14. The San Bernardino Microwave Society's comments parallel those of SCRRBA, and seek to impose local coordinator authority over spread spectrum operations. Their comments outline their views of how to introduce spread spectrum into the amateur community without addressing the relief requested in the League's petition. They, like SCRRBA, wish to utilize this proceeding as a vehicle for introduction of mandatory frequency coordination in the Amateur Services, which raises numerous issues better addressed in a separate proceeding.

15. The comments of the Southeastern Repeater Association, Inc. (SERA) ask principally whether the Commission's spread-spectrum rules should be flexible, and then answer their own question in the negative. SERA goes on to say (without example of their stated problem) that the existing rules are already too loose and flexible. Then, as though this is commendable, they state that, though SS systems are fully capable of causing harmful interference with the rules as they exist today, they have served to have a positive chilling effect on the implementation of such interfering systems. SERA couldn't have made the League's point any more effectively: Whether chilling or not, the present rules are insufficient to adequately promote use of spread spectrum emissions in the Amateur Service. It has been the League's understanding that the Commission did indeed intend to encourage and facilitate spread spectrum operation in the Amateur Service. Other comments in the SERA statements in opposition speak against the existing Rules, not the League's petition. They introduce monitorability issues, already dealt with by the Commission years ago, and adequately addressed by the station identification rules, which

the League does not propose to change[1]. Finally the SERA comments recommend that spread spectrum be located above 902 MHz, which has nothing to do with the League's petition.

IV. Conclusions

16. Most of the opposing commenters ignore the fact that some amateur bands already are occupied by Part 15 spread spectrum devices, many of which are located in close proximity to amateur stations. Surely, the expressed fear of raising the noise floor, and the cumulative effect thereof should have surfaced by now in the bands 902-928 MHz and 2400-2450 MHz from these Part 15 systems, if it was a significant problem at all.

17. Again, the problem that the League seeks to address is not too much spread spectrum in the Amateur Service. The problem is not enough spread spectrum experimentation. Many of the commenters are seized with protecting their existing narrow-band operations, and are concerned (unnecessarily) about increased noise levels in bands used by narrowband modes, rather than promoting spread spectrum for the benefits, including spectrum efficiency, that it can

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[1] The League does not intend to revisit the subject of monitorability of SS communications, because it was already addressed in 1985 and there is no evidence of abuse of amateur allocations by non-amateurs. However, it is noteworthy that the Commission's policy has always been to err on the side of flexibility in balancing monitorability versus new technological experimentation. In permitting unspecified digital codes in the Amateur Service in 1982, the Commission stated:

> In balancing our objectives of encouraging new technologies against assuring our enforcement capability, it must be recognized that there is an incompatibility between authorizing experimentation with "exotic" technologies and the employment of channel monitoring as an enforcement tool. Our ability to verify that the content of messages complies with our rule requirements will be hindered by the broad relaxation of regulatory restraints that we are ordering in this proceeding. However, the Commission finds itself in agreement with the ARRL that special provisions we are including in the final rules, as well as existing provisions that identification be made in plain English or in the international Morse code should, when combined with the zealous effort of the amateur community to protect their allocated frequency bands, provide adequate protection against unauthorized operation in the Service.

Additional Digital Codes, 52 RR 2d 357 (1982).

provide. While the Amateur Service is intended to be an experimental service, which requires flexible rules and some trust of the licensees carrying out experiments, some voices speak in favor of even greater restriction and mandatory control. The imposition of additional constraints would guarantee that the Amateur Service will not be able to keep up with spread spectrum developments in Parts 15 and 90 of the Commission's rules, and will be prevented from maximization of spectrum efficiency in its own bands.

18. The League suggests that its petition, which after all suggests only a modest deregulatory effort, is properly aimed at increasing the flexibility of spread spectrum users in order to allow the development of compatible systems which maximize spectrum efficiency. Those who oppose this increased flexibility do not share the League's view of the Amateur Service as a fundamentally self-regulated service that makes its own efficient accommodations for the varied uses of its frequency allocations. Without mandatory frequency coordination, non-standard definitions of interference, or detailed Commission regulation of spreading codes, the League believes that additional spread-spectrum experimentation is in the best interests of the Amateur Service, and that compatible sharing, long a benchmark of amateur radio, will be as successful in the future as it has been in the past.

Therefore, the foregoing considered, the American Radio Relay League, Incorporated again respectfully requests that the Commission issue a notice of proposed rule making to implement the rules contained in the Appendix to its petition, and adopt the same after an opportunity for notice and public comment thereon.

Respectfully submitted,

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March 12, 1996

CERTIFICATE OF SERVICE

I certify that a copy of the foregoing REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE was sent by first class mail, postage prepaid, this 12th day of March, 1996, to each of the following:

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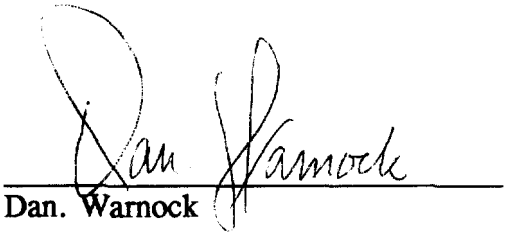

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